

Substrate: Its Effects on Crab Population at Elkhorn Slough

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Introduction

Many teenagers don't know that crabs have an important role in the health of Elkhorn Slough. Elkhorn Slough is an extraordinary ecosystem in the Monterey Bay area that provides a connection between land and sea.¹ It plays a vital part in the health of the environment and is home to many animals including crabs. Our project question is: do the differences in substrate affect the preference and population of the crabs living there? Substrate is the earthy material that exists at the bottom of the slough² (dirt, rocks, etc.). We believe crabs can be an indicator species to a bigger problem in the slough and they can help find the problems there before it affects the entire ecosystem.

Materials and Methods



Material list

- Water boots or hip waders
- Crab traps
- Sampling jars
- Containers to hold crabs
- Nokia Camera
- Bait

Methods

During the months of December, January, and February of 2011, we performed the following procedure:

- Kenton Parker set the crab traps at the site(s) the day before sampling.
- We drew a map of the location of the trap.
- Arrived at the slough and gathered materials.
- Went to the site where the crab traps were placed and collected the traps from the water.
- Placed crabs in a plastic tub containing water. Counted the amount and recorded the species of the crabs.
- Sampled substrate from areas around where the crab traps were placed and analyzed the composition of it.
- Recorded observations. Repeated with the other site(s), if any.
- Repeated during subsequent visits.

Results And Data

In the Elkhorn slough, there are five common species of crab that live there. The crabs are: the European Green crab, the Pacific Rock crab, the Striped Shore crab, the Yellow Shore crab, and the Cancer crab.



The Cancer Crab.



The European Green Crab



The Striped Shore Crab



The Yellow Mud Crab

The substrate we collected at the slough was different in each area. Each area of substrate is unique and ranges from being sandy with small rocks to large with loose soil.

Average	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Bridge	Bridge	Bridge	Bridge
Striped Shore crab	0	0	0.267	0	0	0	0	0	0	0	0
Pacific Rock crab	0	0	0	0	0	0	0	0	0	0	0
European Green crab	0	0.188	0.667	0.231	0	0	0	0	0	0	0
Cancer crab	0	0	0.067	0	0.5	1	4	0	0	0	0
Yellow Mud Crab	0.333	3.938	5.467	6.462	0.5	2	0	0	0	0	1

What is being displayed in the table is the number of crabs, types of crabs, and location. What we found is varying numbers of crabs, with the Yellow Shore crabs being the most abundant. There were almost none of the Striped Shore crabs, Cancer crabs were only found at the bridge, and European Green crabs were the second most abundant type of crab. Cancer crabs preferred the substrate at the Bridge. Yellow Mud crabs were found everywhere at Whistle Stop but rarely at the bridge. European Green crabs were also found everywhere at Whistle Stop but also rarely at the bridge.

Conclusion

According to our data, the European Green crab preferred substrate that had a lot of sea lettuce and large rocks in it. The Yellow Mud crab did not have a preference at the Whistle Stop Lagoon area. We found large numbers of them in every area around the Lagoon. The Cancer crab preferred the substrate at the bridge. Unfortunately the tide was too high the day we were collecting data at the bridge, therefore we weren't able to collect substrate from there. We also do not have enough data on the Striped Shore crab to determine its substrate preference. Further research should be done to determine the preference of Striped Shore crabs. Further research should also be done on the possibility of the invasive species, i.e. European Green crabs, could take over the preferred substrate of the native species living there.

While studying crabs, we have learned that there are many things that crabs can provide. They can be an indicator species to some changes in the substrate in the slough. This is important because the detritus in the substrate is one of the main food sources for many animals in the slough, and crabs can show us if there are any changes in the detritus. Crabs are a food source to many animals in the slough and a sudden emigration can cause the starvation of some animals. While the crabs' decrease in population can come from many sources, pollution could be one of the main causes that provides us for a reason to watch what nonpoint source pollution reaches the slough.

Literature Cited

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